Fall 2016

Developing Nations and Disadvantaged Populations: How the 2009 H1N1 Influenza Pandemic Exacerbated Disparities and Inequities

Rebecca Lebeaux
SIT Study Abroad

Developing Nations and Disadvantaged Populations:

How the 2009 H1N1 Influenza Pandemic Exacerbated Disparities and Inequities

By Rebecca Lebeaux

Fall 2016

SIT Switzerland: International Studies and Multilateral Diplomacy
Academic Director: Dr. Gyula Csurgai

Emory University
Anthropology and Human Biology Major, Applied Math Minor

Abstract

The 2009 H1N1 influenza pandemic, although not as deadly or long lasting as initially projected, demonstrated that the world was and is ill prepared to handle a mass pandemic. As the first pandemic of the twenty-first century, the pandemic revealed global health insecurities and asymmetrical disease burdens for disadvantaged individuals and countries. This paper will analyze why both developing countries and disadvantaged individuals suffered disproportionately from the pandemic. Using the framework of structural violence, this paper will investigate how socioeconomic and political disparities encountered before and during the pandemic caused differential health, societal, political, and economic outcomes. These preexisting disparities will be shown to be compounding and will be used to explain the true and unequal burden of disease. Finally, this paper will offer recommendations that can be used by policymakers to mitigate impacts faced by disadvantaged populations and to improve global health security.

Acknowledgements

Initially the task of combining my interests in anthropology and health with international studies appeared daunting, but with the help of many mentors and individuals I successfully merged these topics into an all-inclusive paper. To provide proper credit, I would like to thank Dr. Heikki Mattila, Dr. Gyula Csurgai, and Ms. Aline Dunant for their mentorship and guidance during the SIT Switzerland: International Studies and Multilateral Diplomacy program. I would also like to thank my interviewees Dr. Pietro Coletti, Dr. Thomas Szucs, Dr. Andreas Reis, and Ms. Anais Legand for the time they took to meet with me and for their helpful insights. Dr. Peter Brown, my research advisor at Emory University, also graciously helped me with my project and offered comments to improve the scope of my paper.

Contents

Page

Introduction

As the first widespread, international influenza pandemic of the twenty-first century, the H1N1 Influenza A pandemic of 2009 identified global health insecurities and inequities. Referred to as swine flu because the original influenza virus was transmitted from pigs to humans or by the virus's strain H1N1, this respiratory illness causes symptoms resembling the seasonal flu such as "cough, fever, sore throat, stuffy or runny nose, body aches, headache, chills, [and] fatigue."[1] Similarly, H1N1 is transmitted though droplets secreted when an infected person coughs, talks, sneezes, or touches a surface that another person touches soon after.[2] While seasonal flu is annual, often it is less serious because some people in the population have encountered a similar strain of influenza or have been given vaccines that give their body immunological memory to fight the virus. With the H1N1 pandemic, however, many people had no recent immunological memory of the strain, which caused widespread infection.

The first laboratory-confirmed cases of H1N1 influenza occurred in Mexico in February of 2009 and the severity of the disease was unknown.[3] Cases were reported in multiple countries throughout the world and by late April the World Health Organization (WHO) declared H1N1 a public health emergency.[4] By June, the WHO recognized H1N1 as a phase 6 pandemic after 73 countries reported more than 26,000 H1N1 cases.[5] Fortunately, the H1N1 pandemic was not as deadly as initially feared. The approximate number of deaths caused directly or indirectly from H1N1 ranged from 100,000 to 400,000, which are similar numbers to a typical flu season.[6] As a comparison to the H1N1 pandemic, the worst pandemic in history, the Spanish influenza

---

[1] "H1N1 Flu Virus (Swine Flu)," *WebMD*, 2016.
[2] Ibid.
[3] Fineberg, Harvey, "Pandemic Preparedness and Response—Lessons from the H1N1 Influenza of 2009," *New England Journal of Medicine* 370, (2014): 1335-1342. doi: 10.1056/NEJMra1208802.
[4] Ibid.
[5] Ibid.
[6] Ibid.

pandemic of 1918 killed approximately 50-100 million people.[7] However, the severity of the pandemic measured in years of life lost surpassed seasonal influenza levels due to the targeted population groups[8] of "healthy children, teenagers and young adults, and pregnant women."[9]

Although the H1N1 pandemic was not as deadly as Spanish influenza, it still offers socioeconomic, cultural, and political lessons to help researchers and policymakers understand inequity in disease distribution during influenza pandemics. This is necessary because influenza, especially the H1N1 strain, has a high mutation rate and probability of causing future pandemics.[10] Therefore, researchers need to analyze every influenza outbreak to prepare for the next one. Further, understanding the burden of influenza and inequity in disease distribution is necessary for future pandemic planning.

Literature Review

Previous papers have shown how influenza pandemics disproportionately impact disadvantaged countries. Murray et al. identified that during the 1918 pandemic there was a link between higher mortality risk and poverty.[11] They found that India and other poor countries had up to a thirty-times greater mortality rate than developed countries.[12] Despite technological advances in influenza prevention and treatment, disparities in socioeconomic status remained relevant during the H1N1 pandemic. As discussed by Knox, the H1N1 pandemic was up to twenty times more severe in some countries than in others.[13] While this can partially be

[7] Fineberg (2014)
[8] Ibid.
[9] Knox, Richard, "2009 Flu Pandemic Was 10 Times More Deadly Than Previously Thought" *National Public Radio,* 2013.
[10] Director General, "Implementation of the International Health Regulations (2005): Report of the Review Committee on the Functioning of the International Health Regulations (2005) in relation to Pandemic (H1N1) 2009," *World Health Organization*, 2011.
[11] Murray, Christopher, Alan Lopez, Brian Chin, Dennis Feehan, and Kenneth Hill, "Estimation of Potential Global Pandemic Influenza Mortality on the Basis of Vital Registry Data from the 1918-20 Pandemic: Quantitative Analysis," *The Lancet* 368, no. 9554 (2006): 2211- 2218. doi: 10.1016/S0140-6736(06)69895-4.
[12] Ibid.
[13] Knox (2013)

attributed to geographical circumstances, outcome differentials between developing and developed countries provide an alternative answer. For instance, Fidler found that some countries did not receive vaccines from developed countries during the pandemic so developing countries suffered disproportionately.[14] Tricco et al. found by looking through many studies that there was a higher prevalence rate of hospitalizations of ethnic minorities in both high-income countries (HIC) and low-income countries (LIC).[15] Regarding economic outcomes, McKibbin et al. found that differential shocks during influenza pandemics asymmetrically impact the economies of developing countries.[16] The paper asserts that this is mostly a result of trading structures and the growing service industry in developing economies.[17] Although a true estimate of the economic impact of the H1N1 pandemic is elusive, it was estimated that the H1N1 pandemic decreased the global Gross Domestic Product (GDP) by 0.5% to 1.5%.[18]

Other papers have described how individuals were disproportionately impacted by the H1N1 pandemic. There appears to be variant reasons for differential outcomes. A paper from Lowcock et al. stated that certain preexisting risk factors associated with being disadvantaged such as being obese, having diabetes, or living with neighborhood-associated psychological stress increased the chance of contracting H1N1.[19] This paper also identified that higher hospital rates were associated with having a high school education or less or coming from a poor neighborhood.[20] Comparatively, Galarce et al. found behavioral and environmental disparities as

---

[14] Fidler, David, "Negotiating Equitable Access to Influenza Vaccines: Global Health Diplomacy and the Controversy Surrounding Avian Influenza H5N1 and Pandemic Influenza H1N1," PLoS Med. 7, no. 5 (2010): e1000247. doi: 10.1371/journal.pmed.1000247.
[15] Tricco, Andrea, Erin Lillie, Charlene Soobiah, Laure Perrier, and Sharon Straus, "Impact of H1N1 on Socially Disadvantaged Populations: Systematic Review," *PLoS One*, 2012. doi: 10.1371/journal.pone.0039437.
[16] McKibbin, Warwick and Alexandra Sidorenko, "Global Macroeconomic Consequences of Pandemic Influenza," *Centre for Applied Macroeconomic Analysis*, 2006.
[17] McKibben (2006)
[18] "The Cost of Swine Flu," *The Economist Newspaper Limited*, 2009
[19]Lowcock, Elizabeth, Laura Rosella, Julie Foisy, Allison McGreer, and Natasha Crowcroft, "The Social Determinants of Health and Pandemic H1N1 2009 Influenza Severity," *American Journal of Public Health* 102, no. 8 (2012): e51-e58. doi: 10.2105/AJPH.2012.300814.
[20] Ibid.

limiting factors to vaccine uptake and thus immunity.[21] Disproportionate health outcomes were also identified by racial status. Dee et al. found that in the United States age-adjusted hospital rates were two times greater for minorities than for Whites during the H1N1 pandemic.[22]

Justification: Disadvantaged Populations and Disproportionate Viral Spread

Few papers have evaluated the H1N1 pandemic from both the perspective of the disadvantaged country and individual. This paper will ask: How and why did developing countries and disadvantaged populations disproportionately encounter negative outcomes during and after the H1N1 influenza pandemic of 2009? Further, how should future influenza pandemic planning mitigate these inequities to protect global health security? Developing countries will be considered disadvantaged in this paper because they generally lack the resources and prestige of developed nations. Disadvantaged individuals will be defined by their socioeconomic, racial, ethnic, or political status.

Ultimately, this research hopes to examine why infectious diseases asymmetrically impact certain individuals both during and long after a pandemic. While infectious diseases are blind to the people that they infect, the institutional structure in which the pathogen can spread is determinate. Throughout this paper the theoretical framework of structural violence will be employed to distinguish how unequal "access to resources, political power, education, health care, and legal standing…" is a form of social injustice and oppression.[23] This framework will also be used to discuss how disparities causing harm on nations have effects that trickle-down to the community and individual level. These compounding effects can help researchers understand

[21] Galarce, Ezequiel, Sara Minsky, and K. Viswanath, "Socioeconomic Status, Demographics, Beliefs and A(H1N1) Vaccine Uptake in the Untied States." *Vaccine* 29, (2011): 5484-5289. doi: 10.1016.j.vaccine.2011.05.014.
[22] Dee, Deborah et al., "Racial and Ethnic Disparities in Hospitalizations and Deaths Associated with 2009 Pandemic Influenza A (H1N1) Virus Infections in the United States," *Annals of Epidemiology* 21, no. 8 (2011): 623-630.
[23] Farmer, Paul, Bruce Nizeye, Sata Stulac, and Salmaan Ksehavjee, "Structural Violence and Clinical Medicine," *PLoS Med* 3, no. 10 (2006): e449. doi: 10.1371/journal.pmed.0030449.

the “true” burden of disease and establish appropriate policies. With this knowledge, proper allocation of resources can be gathered in advance and distributed properly. While tertiary contributors of disease such as discrimination and poverty cannot instantly be eliminated, policies and action plans can be adapted and cycles of inequality can begin to dissipate.

Research Methodology

This research has been conducted using both primary and secondary sources. Primary sources consisted of interviews with four individuals within the field of infectious diseases. Dr. Pietro Coletti is a researcher working at both Institut national de la santé et de la recherce medicale-University Pierre and Marie Curie (INSERM-UMPC) and the Istituto Interscambio Scientifico (ISI) Foundation. He studies the dynamics of infectious diseases and discussed the various factors to consider in modeling infectious disease networks. Dr. Thomas Szucs is a medical doctor and health economist at European Center of Pharmaceutical Medicine (ECPM). He provided me with information on the economics of influenza. Dr. Reis is at the WHO and provided me with information regarding public health ethics during the influenza pandemic. Ms. Legand also works at the WHO as a Program Analyst and provided information regarding influenza pandemic preparedness. Lastly, as an advisor at Emory University and a Medical Anthropologist, Dr. Peter Brown offered critique and advise throughout the paper’s process.

Secondary sources were used qualitatively to supplement the comments and suggestions of interviewees. Sources are a mixture of academic journal articles, opinions by government officials, and reputable news articles discussing the influenza pandemic. The sources consist of information regarding mathematical models, historical background, and comparison papers.

All measures of ethical consideration were applied for this research. Experts were told the objectives of this paper and informed consent was stated. Interviewees were also asked if their

names and the content of the interviews could be used for this paper. To those who asked, summaries of their interview were provided and the completed paper was emailed to them.

Exacerbation of Power Differentials Between Countries During the H1N1 Pandemic

The developing nation-state experiences significant disparities on the global stage and these disparities were amplified during the H1N1 pandemic. While every state would define "developing" differently and not all developing states possess the same level of development, developing states in this paper will consist of low-middle income countries (LMIC). During the H1N1 pandemic, many LMIC faced similar domestic and international burdens. This paper will discuss the socioeconomic and political dilemmas faced by these developing nations that made them more disadvantaged during the H1N1 pandemic. Mexico will be used as a case study to demonstrate how prior disparities caused further disadvantages for LMIC during the pandemic.

Lack of Global Health Oversight Led to the Exacerbation of Power Differentials

Power differentials between developed and developing countries played out as the H1N1 pandemic threatened global security. While power differentials exist between countries during times of stability, during this pandemic international insecurities and inequities were exacerbated. Ethically, the WHO generally endorses a "save the most lives" approach to influenza pandemics.[24] However, these ethical considerations became challenging to implement because mortality was not the primary concern. To protect their own interests, some countries went beyond the rule of law to protect global health security and to ensure health to its citizens.[25] This state-centric narrative acted in a contradictory manner to states' "Responsibility to

[24] "Addressing Ethical Issues in Pandemic Influenza planning: Discussion Papers," *World Health Organization*, 2008.
[25] Hwenda, Lenias, Percy Mahlathi, and Treasure Maphanga, "Why African countries need to participate in global health security discourse," *Global Health Governance* 4, no. 2 (2011).

Protect."[26] Under this concept, states have the right to intervene when national governments put their own citizens at-risk.[27] Therefore, during this time of uncertainty, countries looked to the WHO as an international organization for oversight and leadership. Unfortunately, as described through the International Health Regulations (IHR), the WHO was unable to provide guidance further than recommendations and technical support.

In 2005, the IHR were created to help countries and the world handle disease threats. 194 states in total, including all WHO Member States, became legally bound to these regulations.[28] Enacted in 2007, the 2009 H1N1 influenza pandemic became the first pandemic that these IHR covered.[29] The IHR were created to respond to respiratory illnesses such as Severe Acute Respiratory Syndrome (SARS) and avian influenza in addition to H1N1.[30] These illnesses, however, offer different challenges than H1N1 and resulted in widely applicable regulations. Both SARS and H5N1, for instance, have higher mortality rates than H1N1, but decreased rates of transmission.[31] In some ways the IHR were successful regarding the "timely identification of the pathogen, sensitive and specific diagnostics, [and] highly interactive networks of public health officials."[32] Unfortunately, IHR were not effective because they were not properly implemented in many countries. With this, the WHO released a statement saying "the world is ill-prepared to respond to a severe influenza pandemic."[33] This statement acknowledges IHR implementation inequity and the lack of capacities that LMIC did not and do not possess. Further analysis will demonstrate why LMIC suffered the most and why these IHR did not help them.

[26] "Addressing Ethical Issues in Pandemic Influenza planning: Discussion Papers" (2008)
[27] Ibid.
[28] Director General, WHO (2011)
[29] Fineberg (2014)
[30] Director General, WHO (2011)
[31] Ibid.
[32] Fineberg (2014)
[33] Director General, WHO (2011)

Identifying Power Differentials: Developing Countries Relied on Developed Countries

During the H1N1 pandemic, developing countries suffered from lack of preparation and prevention capacities. While the IHR were designed to facilitate the ability for nation-states to be prepared for pandemics, developing countries did not have excess money or resources to prepare. For instance, surveillance of animals and humans could have identified the spread of H1N1 faster. However, many LMIC did not have sufficient surveillance infrastructure and viewed enforcing IHR as a luxury.[34] Countries that viewed IHR implementation as a luxury often suffer from many other potentially more urgent health problems than swine flu.[35] Diseases related to poverty such as malaria are constantly present and contribute to more morbidity and mortality.[36] For these countries, building up health infrastructure was and is a larger concern than preparing for hypothetical pandemics.[37]

Developing countries also asymmetrically suffered from a lack of health care personnel and hospital resources. H1N1 was not a severe enough pandemic to overwhelm health systems, but variation in health infrastructures contributed to differential health outcomes between countries.[38] In the event of a pandemic, such as H1N1, health care workers are likely to become infected first due to influenza's mode of transmission.[39] All countries will undergo pressures from the initial surge of patients entering the hospital who present influenza or influenza-like symptoms. Industrialized countries and LMIC countries will struggle to meet demand, but developing countries will also be unable to stock basic medical supplies, supply healthcare

[34] Andreas Reis, Public Health Ethicist at the WHO, November 2016.
[35] Sparke, Matthew and Dimitar Anguelov, "H1N1, Globalization and the Epidemiology of Inequality," *Health and Place* 18, no. 4 (2012): 726-736. doi: 10.1016/j.healthplace.2011.09.001.
[36] Director General, WHO (2011)
[37] Reis (2016)
[38] Knox (2013)
[39] Anais Legand, Public Health Analyst at the WHO, November 2016.

workers, and care for other diseases such as HIV.[40] Additionally, many countries, especially some in Africa, do not have national level meetings or engagements regarding health security.[41] Due to these insufficiencies and limitations, many countries likely did not have or know their own capabilities during the pandemic causing more negative health outcomes for inhabitants.

Disparities internationally in health care access disproportionately impact disadvantaged countries. This is evident in countries' abilities to make or apprehend antiviral medications and vaccines at the start of the pandemic. Many developing countries lack the production capacities or companies to make effective vaccines and frequently will not be able to develop large stockpiles.[42] Therefore, another power differential is created as developing countries frequently must buy vaccines from other countries or depend upon foreign donations. Prior to the H1N1 pandemic, vaccine developers were advised to set aside a proportion of vaccines that could be made available to developing countries.[43] Many countries agreed to this, but then withdrew. During the H1N1 pandemic, many countries did not share their vaccines with other countries until they knew they had excess and that the pandemic was mild. [44] Australia, for instance, told its influenza vaccine manufacturer CSL that it could not sell vaccines to the United States until domestic need was met.[45] Likewise, the United States suffered vaccine shortages causing them to retract their agreement with the WHO to donate vaccines.[46] Variation in vaccine donation willingness along with other bureaucratic legal procedures of vaccine distribution prevented many countries from receiving vaccines quickly and efficiently.[47] Limitations in ability to store

[40] Oshitani, Hitoshi, Taro Kamigaki, and Akira Suzuki, "Major Issues and Challenges of Influenza Pandemic Preparedness in Developing Countries," *Emerging Infectious Diseases* 14, no. 6 (2008). doi: 10.3201/eid1406.070839.
[41] Hwenda (2011)
[42] Director General, WHO (2011)
[43] Fineberg (2014)
[44] Fidler (2010)
[45] Ibid.
[46] Ibid.
[47] Director General, WHO (2011)

and administer the vaccine plagued developing countries as well.[48] Without proper preventative measures, health was not assured as a human right.

Developing Countries and the Burden of Social Injustice

Governments, to protect their own image, will often blame other countries for ineffective disease management or for the origins of disease. As Sparke says: "Operating through border-crossing markets and microbes, political-economic inequalities structured the underlying epidemiological interdependency that iniquitous accounts of disease emergences obscured and replaced with territorializing geographies of blame."[49] One of the main failures of the WHO regarding "geographies of blame" is the lack of ability to impose sanctions on states that restrict trade or travel to countries.[50] Although the WHO is supposed to be altruistic and represent all Member States, it is unable to prescribe fairness. Therefore, it is the economies of less stable countries and especially developing countries that suffer from social injustice.

Developing countries are purposely oppressed in the realm of global health security. Frequently, many discussions between developing and developed countries consist of bilateral and multilateral negotiations.[51] Bilateral negotiations between the powerful developed and weak developing countries facilitate unfair treatment of developing countries. To appease these powers and the public, developing countries sometimes become dependent on the aid provided. In Africa, for instance, many countries have become passive recipients of global health securitization.[52] This decreases the need of these LMIC to build up their own infrastructures and develop. Additionally, the "coercive" tactics often employed by HIC creates "resentment and

[48] Director General, WHO (2011)
[49] Sparke (2012)
[50] Fineberg (2014)
[51] Hwenda (2011)
[52] Ibid.

suspicions about ulterior motivations."[53] Conclusively, the inability for these countries to break free of developed countries poses a major challenge to sustainable global health security.

Given the negative economic consequences of influenza, many HIC took action to ensure the protection of their citizens. Countries imposed methods to reduce disease transmission from other countries during the pandemic. To prevent the spread of disease, it is important to issue travel warnings and potentially measure temperatures of individuals at transport hubs to improve global health security.[54] HIC countries, however, used more severe measures to ensure safety that disproportionately impacted LMIC. Some methods that countries used included: "trade (import) bans, revoked export licenses, temporary restrictions of import quotas…and media based advertisements dissuading people from purchasing and consuming certain animal food products."[55] Russia and China, for instance, officially imposed bans on swine and pork products with effects that could be felt throughout the agricultural market.[56] These changes in trade policy generally impacted LMIC more than HIC because HIC generally have a less volatile economy.

Domestic Consequences of Power Differentials

There are direct, indirect, and intangible costs when evaluating the socioeconomic burden of influenza.[57] Direct costs relate to hospitalization and treatment and will be explored in context to the individual's experience with the H1N1 pandemic. Indirect and intangible costs will be evaluated in the context of the global economy because these costs often depend upon the fortitude of the health system.[58] Respectively, they are due to "productivity losses and

[53] Hwenda (2011)
[54] Thomas Szucs, Medical Doctor and Health Economist at ECPM, October 2016.
[55] Burgos, Sigfrido, and Joachim Otte, "Linking Animal Health and International Affairs: Trade, Food, Security and Global Health," *Yale J. Int'l Aff.* 6, (2011): 108.
[56] Attavanich, Witsanu, Bruce McCarl, and David Bessler, "The Effect of H1N1 (Swine Flu) Media Coverage on Agricultural Commodity Markets," *Applied Economic Perspectives and Policy* 33, no. 2 (2011): 241-259. doi: 10.1093/ aepp/ ppr008.
[57] Szucs (2016)
[58] Ibid.

absenteeism from school or work" and "impaired performance and effects of disease on quality of life."[59] Indirect and intangible costs make up a higher proportion of GDP spending than direct costs. In the United States, for instance, the direct costs of seasonal influenza each year is one to three billion dollars while indirect costs can reach ten to fifteen billion dollars.[60] Therefore, the importance of evaluating indirect and intangible costs of the pandemic cannot be ignored.

While the H1N1 pandemic was not the most debilitating pandemic in human history, the economic toll was widespread but not evenly distributed across countries. Although it is challenging to estimate the overall impact of the pandemic in conjunction with the concurrent global recession, it is clear that the pandemic exacerbated the problems of this recession.[61] A mild pandemic, such as the H1N1 pandemic, was projected to reduce the world's GDP by approximately 0.8% ($US330 billion).[62] Previous research has been unable to conclude the sum economic consequences of the pandemic, but estimates ranged from global GDP losses of 0.5% to 1.5%.[63] For instance, a World Bank estimate stated that costs related to the pandemic could decrease countries' GDPs by more than 1%.[64] In many HIC, small GDP reductions can be minimized. Unstable economics such as the ones in LMIC, however, were disproportionately impacted. In general the impacts of the pandemic included "a fall in the labor force to different degrees in different countries due to a rise in mortality and illness; an increase in the cost of doing business; a shift in consumer preferences away from exposed sectors; and a re-evaluation of country risk as investors observe the responses of the governments."[65] Accordingly, these negative consequences tended to impact countries that rely on trade or service for their

[59] Szucs (2016)
[60] Ibid.
[61] "The Cost of Swine Flu," (2009)
[62] McKibben (2006)
[63] "The Cost of Swine Flu," (2009)
[64] Ibid.
[65] McKibben (2006)

economies such as LMIC.[66] The H1N1 influenza pandemic demonstrated the advantages of having diversified economies that are self-reliant.

Public perception of diseases also can have a major impact on developing nations. Stigma contributes to how domestic populations respond to country's pandemic responses. Often the inability for governments to procure vaccines or disseminate knowledge can lead to distrust of public leaders and to resistance from the public.[67] This can be seen in a study conducted within Switzerland after the H1N1 pandemic. The public was asked who they thought were heroes, villains, and victims of the pandemic. The victims of the pandemic, namely LMIC such as Asian countries and Mexico, were "singled out for their lack of hygiene, discipline or culture."[68] As distanced individuals ascribe blame directly to individuals within countries, growing internal disparities became exacerbated. On a population level, mass panic then amplified already disproportionate health care allocations.[69] While the H1N1 pandemic was not detrimental enough to create mass rioting, residual governmental distrust is long lasting.

Mexico and the H1N1 Pandemic

While countless countries suffered disproportionate outcomes from the pandemic, Mexico offers the best overview of pandemic inequities because it was the virus's country of origin. Consequentially, Mexico likely experienced the worst social injustice and economic strife. This section will use Mexico to show the non-health related impacts of the H1N1 pandemic and how social injustice and structural violence impact developing countries.

---

[66] McKibben (2006)
[67] Director General, WHO (2011)
[68] Wagner-Egger, Pascal et al., "Lay Perceptions of Collectives at the Outbreak of the H1N1 Epidemic: Heroes, Villains, and Victims," *Public Understanding of Science* 20, no. 4 (2011): 461-476. doi: 10.1177/0963662510393605.
[69] Barrett, Ron. and Peter Brown, "Stigma in the Time of Influenza: Social and Institutional Responses to Pandemic Emergencies," *Journal of Infectious Diseases* 197, Suppl. 1 (2008): S34-S37. doi: 10.1086/524986.

Mexico suffered greatly from the concept of "geographies of blame." Although Mexico was the location of the first cases of swine flu, the virus spread because of globalization and through economic powers such as the United States.[70] Many attempts were made by the American government to deflect blame.[71] Worried about global image with regards to trade policy and economic security, the Unites States used Mexico as a scapegoat to attribute disease etiology. China's outlook on the virus also attributed blame to Mexicans for the disease. They felt that Westerners, especially Mexicans, shared similar DNA that differed from pure Chinese DNA protecting them from the disease's spread.[72] When someone did get sick in China, however, they claimed that person was not of pure Chinese blood.[73] Mexico, therefore, acts as an example of a LMIC greatly impacted by the unequal power distribution between LMIC and HIC.

Mexico's economy was severely compromised because of changes in pork exportation and tourism. Both changes to economic stability were influenced by the risk perception of both industries.[74] Although swine flu cannot be transmitted through pigs or pig farming, [75] public perception of Mexico and media portrayal of the pork industry falsely portrayed pigs and pork to be transmission vectors.[76] As a result, Mexico lost $US 27 million in the pork industry.[77] Additionally, domestic demand decreased for pork after media reports stated that a farm in Veracruz was associated with influenza infection.[78] Internationally, chilled or fresh exports to Japan and the United States fell by 61.48% and 31.65% respectively.[79] After this incident,

---

[70] Sparke (2012)
[71] Ibid.
[72] Mason, Katherine, "H1N1 is Not a Chinese Virus: the Racialization of People and Viruses in Post-SARS China," *Studies in Comparative International Development* 50, no. 4 (2015): 500-518. doi: 10.1007/s12116-015-9198-y.
[73] Ibid.
[74] Rassy, Dunia and Richard Smith, "The Economic Impact of H1N1 on Mexico's Tourist and Pork Sectors," *Health Economics,* 2012. doi: 10.1002/hec.2862.
[75] "H1N1 Flu Virus (Swine Flu)" (2016)
[76] Rassy (2012)
[77] Ibid.
[78] Ibid.
[79] Ibid.

Mexico was unable to return to its pre-pandemic pork export level for multiple years.[80] The tourism sector also suffered consequences of the pandemic after travel advisories and airline cancellations reflected international fear of contracting influenza.[81] As the biggest aspect of Mexico's service sector, as demonstrated in many developing countries, the decreasing amount of tourists and global economic crisis led to a "virtual halt of the industry."[82] A million tourists were lost during this time, costing $US 2.8 billion.[83] Ultimately, while both of these economic sectors could recover, it was the individual who suffered during and after the pandemic.

Disparities Prior to the H1N1 Pandemic Impacted Individuals During and After

While prior analysis has focused on a macro-level analysis of a disadvantaged nation-state within an international arena, this section will focus on the woes that individuals face within their communities. This micro-level analysis will help construct the "true" burden of the H1N1 pandemic and will build upon the disadvantages experienced by developing countries. Together, these sections will expose the trickle-down effect of disparities and how disparities at a macro-level compound those on an individual level.

Preexisting Health and Psychological Burdens

The H1N1 influenza pandemic asymmetrically impacted certain populations of individuals. To understand why this occurred, it is necessary to understand the impacts of social determinants of health, which are the societal factors that contribute to the health of individuals. Some social determinants such as socioeconomic background, racial/minority status, and educational status contribute greatly to individuals' health. Primarily, certain social determinants

[80] Rassy (2012)
[81] Ibid.
[82] Ibid.
[83] Ibid.

such as coming from a low socioeconomic group, being non-White, and not having a college degree are associated with preexisting conditions such as coronary disease, diabetes, asthma, and hypertension.[84] As preexisting conditions lower viral immunity, disadvantaged individuals had an asymmetrical risk of acquiring H1N1. Regardless of proximity to the virus, prior disparities made disadvantaged individuals more vulnerable to the pandemic.

Not only did prior health conditions make disadvantaged populations vulnerable, but the environments that disadvantaged individuals inhabited also caused psychological and mental stress during the pandemic. Environmental factors related to poverty left individuals especially vulnerable to H1N1 infection. Public housing residents and individuals who consider themselves to be impoverished often possess poorer health.[85] Some burdens that public housing residents face include "unsafe drinking water, absence of hot water for washing…overcrowding, and inadequate ventilation."[86] All of these volatile environmental elements made them more vulnerable to H1N1 infection. Impoverished individuals in particular also suffer from involvement with social services. Firstly, social service can curb self-confidence and reduce individual's abilities to weigh decisions.[87] Secondly, societal stigma surrounding use of social services can lead to marginalization, which can further exacerbate problems such as poverty and neglect.[88] In combination with risk factors that arise from health pre-existing conditions, impoverished individuals are vulnerable to contracting diseases. Accordingly, during the pandemic, impoverished individuals had a greater risk of acquiring influenza.

---

[84] Hutchins, Sonja, Kevin Fiscella, Robert Levine, Danielle Ompad, and Marian McDonald, "Protection of Racial/Ethnic Minority Populations During an Influenza Pandemic," *American Journal of Public Health* 99, no. S2 (2009): S261-S270. doi: 10.2105/AJPH.2009.161505.
[85] Bouye et al., "Pandemic Influenza Preparedness and Response Among Public-Housing Residents, Single-Parent Families, and Low-Income Populations," *American Journal of Public Health* 99, no. S2 (2009).
[86] Ibid.
[87] Groleau, Danielle, "Embodying 'health citizenship' in Health Knowledge to Fight Health Inequalities," *Rev Bras Enferm* 64, no. 5 (2011): 811-816.
[88] Barrett (2008)

Spatial and temporal proximity to H1N1 also put individuals at a higher risk of contracting the disease. There are associations between being a member of a disadvantaged population and coming in contact with diseases due to lifestyle. For instance, many disadvantaged populations live in cities, take public transportation, and work in the service industry which all could have increased the likelihood of influenza transmission. Presenteeism is also a behavior that can increase the spread of influenza. The behavior encourages individuals to show up to work where there is a higher risk of infection or when they are already infected.[89] Impoverished individuals are disproportionately impacted by this phenomenon because they have an asymmetric fear of losing their job or pay.[90] Coming to work during the H1N1 pandemic increased the odds that a sick individual would contract a more severe form of illness and spread the disease further. Disadvantaged individuals, specifically impoverished ones, faced tough and potentially life-or-death decisions regarding presenteeism. These were decisions that other members of society did not have to contemplate—a disparity in its own right.

Ultimately, disparities that disadvantaged populations encounter are multi-factorial and difficult to overcome. During the pandemic, these disparities put disadvantaged individuals at-risk and were results of macro-level structural violence. Further sections will expose other forms of structural violence that individuals encountered during and after the pandemic.

Inequities in Access to Health Care During the Pandemic

Disadvantaged individuals often face issues accessing health care. This problem causes differential morbidity and mortality in vulnerable populations. During the H1N1 pandemic, access to preventative measures such as the vaccine and antiviral drugs was a great cause of concern, as they were not equally distributed across all individuals in society. Understanding

[89] Szucs (2016)
[90] Ibid.

disparities that reduced vaccine coverage is a necessary component to understand the impacts of structural violence during the H1N1 pandemic.

Systemic barriers to vaccine acquisition are often accompanied by differences in vaccine-seeking behavior between the general population and disadvantaged populations. The inability for disadvantaged populations to receive vaccinations at an equal rate to the general population was likely exacerbated by disparities.[91] One study identified that perception of vaccine safety was a limiting factor to vaccine uptake during the pandemic and identified that Black and less educated individuals in the United States were less likely to be vaccinated for this reason.[92] Although this paper illustrated choice in receiving the vaccine, many individuals in developing countries were unable to acquire the vaccine at all due to either individual or governmental limitations. Some non-behavioral reasons that individuals did not get vaccinated included the lack of the ability for the country to get vaccines and the inability for individuals to rearrange schedules to get the vaccine. As seen in Switzerland and in other countries, vaccine distribution was not consistent and sometimes not well managed.[93] During the H1N1 pandemic, vaccines were not as readily available or as consistently offered as they are during a seasonal influenza outbreak. Therefore, more effort was needed for individuals to get vaccinated during the pandemic and being poor or less educated acted as a disadvantage.[94] Suffering from their environments, these individuals likely did not receive sufficient prevention for the H1N1 pandemic and this contributed to differential health outcomes.

[91] Hutchins (2009)
[92] Galarce (2011)
[93] Szucs (2016)
[94] Hutchins (2009)

Economic Burdens Experienced During and After the Pandemic

In addition to negative health outcomes, disadvantaged individuals encountered more economic woes during the H1N1 pandemic. Similar to the socioeconomic disadvantages experienced by developing nations, negative economic effects often disproportionately occur among racial or ethnic minorities.[95] Minority populations often face economic disparities because they are most often the population groups that are impoverished. Therefore, during the pandemic, the disadvantaged became disproportionately poorer. During this pandemic, vulnerable populations suffered for a variety of reasons including the inability to "stockpile food and clean water or pay for utilities, transportation, and shelter."[96] This section, however, will explore how missing work and decreasing consumerism were two predominant impacts that impoverished individuals disproportionately faced during the H1N1 pandemic. As an example of proper foresight by the government of the United States during the pandemic, the decision to keep schools open and its economic benefits will be analyzed.

During the pandemic, the service and trade industry were negatively impacted and this inevitably stunted the individual. As previously identified, some economic effects of the pandemic included a reduction in pork consumption, net economic losses in pork-producing countries, and decreases in tourism.[97] Many disadvantaged individuals, due to their levels of education, work in the service industry.[98] Global changes to international trade and tourism disproportionately impacted individuals who make livings off these industries. While companies lost money during the pandemic, it is the individual who faced the dire consequences such as not being able to afford food, water, or healthcare.

---

[95] Hutchins (2009)
[96] Ibid.
[97] Rassy (2012)
[98] Hutchins (2009)

In addition to the changing global context, domestic fear of disease and absenteeism from work also contributed to economic woes. The possibility of becoming infected with the swine flu posed a major threat to the economic stability of disadvantaged individuals. Accounting for up to 90% of influenza economic costs, absenteeism loomed as a possibility to many impoverished individuals.[99] This is because absenteeism from work due to pre-determined work closures or due to H1N1 infection, created economic concerns in affording basic necessities for impoverished individuals.[100] Women, as primary or sole caretakers in many countries, likely asymmetrically suffered from this reality.[101] Additionally, although the H1N1 pandemic was too mild to close down many businesses, the possibility of job loss was likely a concern at the beginning of the pandemic when its severity was unknown.[102] The challenges associated with absenteeism and job loss demonstrate why diseases do not impact everyone equally.

Although the H1N1 pandemic was negative for many individuals in the United States, greater economic losses may have occurred if schools had closed. After evaluating the virulence and severity of H1N1 in Mexico, the Untied States decided against mandatory school closures.[103] This decision was positive because school closures disproportionately impact disadvantaged individuals. Firstly, many parents have to take off work when schools are closed increasing the prevalence of absenteeism.[104] Additionally many parents living near the poverty line do not have sufficient money to pay for childcare services and/or support the child during this time. This is further compounded by the inability for students to receive school lunch.[105] Lack of school also creates more free time away from rules and obligations. Without the confines of school and

---

[99] Szucs, Thomas, "The Socio-economic Burden of Influenza," *Journal of Antimicrobial Chemotherapy* 44, Supplement B (1999): 11-15. doi: 10.1093/jac/44.suppl_2.11.
[100] Szucs (2016)
[101] Anais Legand, Public Health Analyst at the WHO, November 2016.
[102] Director General, WHO (2011)
[103] Cauchemetz, Simon et al., "Closure of Schools During an Influenza Pandemic," *The Lancet* 9, 2009.
[104] Ibid.
[105] Ibid.

education, there are greater chances of individuals participating in dangerous activities such as drug use or violence.[106] Further, educational deficients are disproportionately seen in disadvantaged students when they go without school for extended periods of time.[107] In the United States, a well-calculated decision was made to not close schools during the pandemic. For future pandemics, however, it is possible that school closures will be necessary to protect public health. Ultimately, these school closures will put the most economic stress on disadvantaged individuals and children will face many of the immediate and long-term consequences.

Consequences of Disparities and the H1N1 Pandemic: Hospitalization Rates and Morbidity

Manifestations of disparities can be seen in hospitalization rates, morbidity, and mortality as preexisting conditions and the inability to access healthcare lead to more adverse outcomes. In general, "racial/ethnic minority populations have higher rates of injuries, poor health conditions, adverse health outcomes, and lack of access to health care."[108] These outcome differentials were exacerbated during the H1N1 pandemic. Not only did disadvantaged individuals have worse health outcomes, but they likely asymmetrical suffered during the pandemic. Fear of losing jobs and the cost of health care, for instance, prevented individuals from going to the doctor. Additionally, access to symptom-relief medications was also compromised or inaccessible. This section will pull together previous sections to illustrate the overlapping factors that produce the tangible health outcomes of disparities.

Preexisting environmental, behavioral, and health disparities increased the risk of disadvantaged individuals suffering from the pandemic. Behavioral and environmental conditions also frequently create health disparities that act as gateways to more severe health

[106] Cauchemetz (2009)
[107] Ibid.
[108] Hutchins (2009)

outcomes such as hospitalization rates. For instance, one study found that hospitalized patients during the pandemic were more likely to come from neighborhoods with lower levels of education.[109] Upon further research, body mass index (BMI) was found to be the confounding factor.[110] Having a high BMI often can be attributed to an unhealthy diet. This characteristic frequently is present in disadvantaged populations due to limited financial or proximal access to nutritious foods. In conjunction with higher preexisting conditions such as diabetes, increased BMI makes vulnerable populations more vulnerable.[111] The severe consequences of seemingly mundane health problems represent the ongoing plight and cycle of inequality that many vulnerable populations experience. The accumulation of certain characteristics caused the health disparities that led to differential health outcomes during the pandemic.

While preexisting conditions may have been a major factor for health outcomes during the pandemic, factors directly related to the environment and behavior of disadvantaged individuals caused differential health outcomes. A severe health complication of the H1N1 virus that led to the increased hospitalization rates in disadvantaged individuals was secondary bacterial pneumonia. Additionally, this complication of influenza led to greater rates of morbidity and mortality. Pneumococcal pneumonia has been linked to racial and ethnic minorities.[112] Increased risks for these populations were unrelated to preexisting health conditions. Rather, the disparities seen in secondary pneumonia were likely due to low rates of preventative measures and variant access to care.[113] An additional reason for the increased pneumonia during the pandemic could also be methicillin-resistant *Staphylococcus aureus* (MRSA) infections because they disproportionately infect individuals residing in public housing,

[109] Lowcock (2009)
[110] Ibid.
[111] Hutchins (2009)
[112] Ibid.
[113] Ibid.

are homeless, or in prison.[114] Disassociating causality of secondary infections from preexisting health conditions, which could arguably have existed in the general population, demonstrates that differential outcomes were not solely associated with an individual's health. Rather, structural violence and the social determinants of health directly caused differential health outcomes.

Conclusion and Recommendations

This paper has discussed how LMIC and disadvantaged populations asymmetrically suffered from the 2009 H1N1 pandemic as compared to HIC and general populations. On the international level, this paper found that LMIC faced an exacerbation of power differentials and the burden of social injustice. Disadvantaged individuals, meanwhile, disproportionately experienced macro-level inequalities such as globalization and socioeconomic disparities. These inequities led to differential suffering from health, socioeconomic, and political outcomes.

While the H1N1 pandemic was not as deadly as initially projected, conclusions regarding disadvantaged individuals and populations give the best modern insights on the impact of future influenza pandemics. This final section will make recommendations for policymakers on how to protect developing countries and disadvantaged individuals for the next influenza pandemic.

Build Disease Simulation Models that Account for Disadvantaged Populations

Understanding future human behavior is challenging and impossible to predict with complete accuracy. While researchers often do take into account travel patterns, behaviors, and social habits, there is variance across humans and countries.[115] Often, these disease simulation models, however, are still able to provide insight on how a disease will spread. To better protect all individuals in the future from influenza pandemics, it is necessary to adapt these models to

[114] Hutchins (2009)
[115] Pietro Coletti, Disease Simulation Researcher with INSERM-UMPC and ISI, September 2016.

account for specific risk factors, limitations, and behaviors of disadvantaged individuals. Models need to be ethically and financially practical to monitor what preventative measures can be taken to prevent disease. These models should not ignore the general population, but offer possibilities for policymakers to stratify for certain factors such as age, race, and socioeconomic status. Ultimately, this will allow for the best understanding of how interventions will improve disadvantaged individuals' lives and maintain global health security.

Provide Motivation for Developed Countries to Supply Technology, Vaccines, Resources, etc.

Currently, other than for altruistic measures and the Responsibility to Protect, developed nations have very little motivation to help developing countries. To prevent the spread of the virus from developing countries to developed countries and to ensure the health and prosperity of as many individuals as possible, countries need to practice preemptive health security measures.

If developed countries are unwilling to provide for developing countries, it may be necessary for the WHO to provide assistance. Without the ability to enforce sanctions, the WHO must rely upon its technical and political power[116] and could protect global health security through three main methods. The first method is a continuation of current policies. The WHO would provide technical assistance, pandemic preparedness, and resource sharing recommendations to countries. This has worked relatively well in the past, but it is challenging to know this option's feasibility during a more severe pandemic.[117] A second and less viable option could be for the WHO to politically denounce countries that do not follow IHR or do not share resources. This plan encourages political follow-through, but this method may decrease overall trust in the WHO and may not bring about change.[118] Lastly, the WHO could offer incentives for

[116] Legand (2016)
[117] Ibid.
[118] Ibid.

developed countries to aid developing countries in pandemic preparation. Politically this could be arranged if developed countries are offered other economic incentives in related fields such as trade or the environment. This may be the most altruistic option, but is the most challenging to implement. It would require partnerships between governments, the public, and businesses.

Limit Poverty and Invest in Infrastructure

The best way to advance equality is to reduce the structural violence that causes poverty because socioeconomic tension often contributes to ethnic, racial, and educational disparities. Reducing poverty also changes environmental and behavioral factors that create disparities in health outcomes. While the goal of ending poverty is idealistic, the wide-reaching benefits outweigh initial hardships.

Investing in development through improving infrastructure, specifically health infrastructure, would also limit the impacts of a pandemic. If LMIC countries can control access to preventative measures and resources, self-sufficiency and sustainability can be obtained. With proper surveillance and counter-disease measures, influenza pandemics could be stopped sooner. Lastly, building schools and improving health education could also quell a pandemic's spread.[119]

While none of these interventions will come to complete fruition in the near future, it is necessary to incorporate aspects into influenza pandemic preparedness. Changing public perceptions regarding inequalities and emphasizing long-term consequences of present day actions are necessary to influenza preparedness. Without global cooperation, equality across individuals, and willingness to erase disparities, the world will face the consequences of the next influenza pandemic. By adapting proper measures to take control of influenza's spread, humans can control the narrative of influenza and make a future that ensures health as a human right.

[119] Legand (2016)

Primary Source References

Anais Legand, Public Health Analyst at the WHO, November 2016.

Andreas Reis, Public Health Ethicist at the WHO, November 2016.

Pietro Coletti, Disease Simulation Researcher with INSERM-UMPC and ISI, September 2016.

Thomas Szucs, Medical Doctor and Health Economist at ECPM, October 2016.

Secondary Source References

"Addressing Ethical Issues in Pandemic Influenza planning: Discussion Papers." *World Health Organization*, 2008.

Attavanich, Witsanu, Bruce McCarl, and David Bessler. "The Effect of H1N1 (Swine Flu) Media Coverage on Agricultural Commodity Markets." *Applied Economic Perspectives and Policy* 33, no. 2 (2011): 241-259. doi: 10.1093/ aepp/ ppr008.

Barrett, Ron. and Peter Brown. "Stigma in the Time of Influenza: Social and Institutional Responses to Pandemic Emergencies." *Journal of Infectious Diseases* 197, Suppl. 1 (2008): S34-S37. doi: 10.1086/524986.

Bouye et al. "Pandemic Influenza Preparedness and Response Among Public-Housing Residents, Single-Parent Families, and Low-Income Populations." *American Journal of Public Health* 99, no. S2 (2009).

Burgos, Sigfrido, and Joachim Otte. "Linking Animal Health and International Affairs: Trade, Food, Security and Global Health." *Yale J. Int'l Aff.* 6, (2011): 108.

Cauchemetz, Simon et al. "Closure of Schools During an Influenza Pandemic." *The Lancet* 9, 2009.

Dawood, Fatimah et al. "Estimated Global Mortality Associated with the First Months of 2009 Pandemic Influenza A H1N1 Virus Circulation: A Modeling Study." *The Lancet Infectious Diseases*, 2012. doi: 10.1016/S1473-3099(12)70121-4.

Dee, Deborah et al. "Racial and Ethnic Disparities in Hospitalizations and Deaths Associated with 2009 Pandemic Influenza A (H1N1) Virus Infections in the United States." *Annals of Epidemiology* 21, no. 8 (2011): 623-630.

Director-General. "Implementation of the International Health Regulations (2005): Report of the Review Committee on the Functioning of the International Health Regulations (2005) in relation to Pandemic (H1N1) 2009." *World Health Organization*, 2011.

Farmer, Paul, Bruce Nizeye, Sata Stulac, and Salmaan Ksehavjee. "Structural Violence and Clinical Medicine." *PLoS Med* 3, no. 10 (2006): e449. doi: 10.1371/journal.pmed.0030449.

Fidler, David. "Negotiating Equitable Access to Influenza Vaccines: Global Health Diplomacy and the Controversy Surrounding Avian Influenza H5N1 and Pandemic Influenza H1N1." PLoS Med. 7, no. 5 (2010): e1000247. doi: 10.1371/journal.pmed.1000247.

Fineberg, Harvey. "Pandemic Preparedness and Response—Lessons from the H1N1 Influenza of 2009." *New England Journal of Medicine* 370, (2014): 1335-1342. doi: 10.1056/NEJMra1208802.

Galarce, Ezequiel, Sara Minsky, and K. Viswanath. "Socioeconomic Status, Demographics, Beliefs and A(H1N1) Vaccine Uptake in the Untied States." *Vaccine* 29, (2011): 5484-5289. doi: 10.1016.j.vaccine.2011.05.014.

Groleau, Danielle. "Embodying 'health citizenship' in Health Knowledge to Fight Health Inequalities." *Rev Bras Enferm* 64, no. 5 (2011): 811-816.

"H1N1 Flu Virus (Swine Flu)." *WebMD*, 2016.

Hutchins, Sonja, Kevin Fiscella, Robert Levine, Danielle Ompad, and Marian McDonald. "Protection of Racial/Ethnic Minority Populations During an Influenza Pandemic." *American Journal of Public Health* 99, no. S2 (2009): S261-S270. doi: 10.2105/AJPH.2009.161505.

Hwenda, Lenias, Percy Mahlathi, and Treasure Maphanga. "Why African countries need to participate in global health security discourse." *Global Health Governance* 4, no. 2 (2011).

Knox, Richard. "2009 Flu Pandemic Was 10 Times More Deadly Than Previously Thought." *National Public Radio,* 2013.

Lowcock, Elizabeth, Laura Rosella, Julie Foisy, Allison McGreer, and Natasha Crowcroft. "The Social Determinants of Health and Pandemic H1N1 2009 Influenza Severity." *American Journal of Public Health* 102, no. 8 (2012): e51-e58. doi: 10.2105/AJPH.2012.300814.

Mason, Katherine. "H1N1 is Not a Chinese Virus: the Racialization of People and Viruses in Post-SARS China." *Studies in Comparative International Development* 50, no. 4 (2015): 500-518. doi: 10.1007/s12116-015-9198-y.

McKibbin, Warwick and Alexandra Sidorenko. "Global Macroeconomic Consequences of Pandemic Influenza." *Centre for Applied Macroeconomic Analysis,* 2006.

Murray, Christopher, Alan Lopez, Brian Chin, Dennis Feehan, and Kenneth Hill. "Estimation of Potential Global Pandemic Influenza Mortality on the Basis of Vital Registry Data from

the 1918-20 Pandemic: Quantitative Analysis." *The Lancet* 368, no. 9554 (2006): 2211-2218. doi: 10.1016/S0140-6736(06)69895-4.

Oshitani, Hitoshi, Taro Kamigaki, and Akira Suzuki. "Major Issues and Challenges of Influenza Pandemic Preparedness in Developing Countries." *Emerging Infectious Diseases* 14, no. 6 (2008). doi: 10.3201/eid1406.070839.

"Pandemic Influenza Preparedness Framework for Sharing of Influenza Viruses and Access to Vaccines and Other Benefits." *World Health Organization*, 2008.

Rassy, Dunia and Richard Smith. "The Economic Impact of H1N1 on Mexico's Tourist and Pork Sectors." *Health Economics*, 2012. doi: 10.1002/hec.2862.

Sparke, Matthew and Dimitar Anguelov. "H1N1, Globalization and the Epidemiology of Inequality." *Health and Place* 18, no. 4 (2012): 726-736. doi: 10.1016/j.healthplace.2011.09.001.

Szucs, Thomas. "The Socio-economic Burden of Influenza." *Journal of Antimicrobial Chemotherapy* 44, Supplement B (1999): 11-15. doi: 10.1093/jac/44.suppl_2.11.

"The Cost of Swine Flu." *The Economist Newspaper Limited*, 2009.

Tricco, Andrea, Erin Lillie, Charlene Soobiah, Laure Perrier, and Sharon Straus. "Impact of H1N1 on Socially Disadvantaged Populations: Systematic Review." *PLoS One*, 2012. doi: 10.1371/journal.pone.0039437.

Wagner-Egger, Pascal et al. "Lay Perceptions of Collectives at the Outbreak of the H1N1 Epidemic: Heroes, Villains, and Victims." *Public Understanding of Science* 20, no. 4 (2011): 461-476. doi: 10.1177/0963662510393605.

Acronym List

BMI	Body Mass Index
GDP	Gross Domestic Product
HIC	High Income Countries
IHR	International Health Regulations
INSERM-UPMC	Institut national de la santé et de la recherce medicale-University Pierre and Marie Curie
ISI	Istituto Interscambio Scientifico
LIC	Low Income Countries
LMIC	Low-Middle Income Countries
WHO	World Health Organization